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| EXAMINER | |
|---|---|
| PATEL, JAYESH A | |
| **ART UNIT** | **PAPER NUMBER** |
| 2624 | |

| SHORTENED STATUTORY PERIOD OF RESPONSE | MAIL DATE | DELIVERY MODE |
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| 3 MONTHS | 02/08/2007 | PAPER |

**Please find below and/or attached an Office communication concerning this application or proceeding.**

If NO period for reply is specified above, the maximum statutory period will apply and will expire 6 MONTHS from the mailing date of this communication.

| Office Action Summary | Application No. | Applicant(s) |
|---|---|---|
| | 10/684,139 | RAO ET AL. |
| | **Examiner** | **Art Unit** |
| | Jayesh A. Patel | 2624 |

*-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --*

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

1)☒ Responsive to communication(s) filed on *10 October 2003*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

4)☒ Claim(s) *1-25* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-25* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

**Application Papers**

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *19 March 2004* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO/SB/08)
Paper No(s)/Mail Date *03/19/2004*.
4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

## DETAILED ACTION

### *Claim Rejections - 35 USC § 112*

The following is a quotation of the second paragraph of 35 U.S.C. 112:

> **The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.**

Claims 9,13,14 and 23 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

The term "approximately" in claims 9,13 and 23 is a relative term, which renders the claim indefinite. The term "approximately" is not defined by the claim, the specification does not provide a standard for ascertaining the requisite degree, and one of ordinary skill in the art would not be reasonably appraised of the scope of the invention. For example in Claims 9 and 23 "the range of approximately" has a long range of approximation between 300 and 800 nm wavelengths.

Regarding Claim 14, the term image size "less than 10cm sup 2" renders the claim indefinite. The less than would mean any size less than 10cm sup 2 and is not specific.

### *Claim Rejections - 35 USC § 102*

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claims 1,6,8-12,15,20,22-25 are rejected under 35 U.S.C. 102(b) as being anticipated by Yu (US 4695973) hereafter Yu.

**1.** Regarding Claim 1, Yu discloses an optical system in **(Fig 1)** for processing a medical image comprising: an input image **(Element 29 and Col 3 Lines 41-45)**; a light source emitting light directed at the input image **(Element 14 and Col 3 Lines 13-15)**; a first optical Fourier element than transforms light from the input image **(Element 32 and Col 3 Lines 46-47)**; a spatial filter that filters the transformed light **(Element 36 and Col 3 Lines 57-59)**; a second optical Fourier element that receives the filtered transformed light and generates an inverse transform to provide a processed image **(Element 44 and Col 4 Lines 18-20)**; and an image sensor that detects the processed image and generates an electronic representation of the processed image at **(Element 48 and Col 4 Lines 24-26)**.

**2.** Regarding Claim 6, Yu discloses the optical system of claim 1, wherein the light source comprises a laser in **(Fig 1, Element 14 and Col 3 Lines 1-2)**.

**3.** Regarding Claim 8, Yu discloses the optical system of claim 1, wherein the first and second optical Fourier elements are lenses at **(Fig 1, Elements 32, 44**

**and Col 3 Lines 46-47,Col 4 Lines 18-20)**.

**4.** Regarding Claim 9,Yu discloses the optical system of claim 1, wherein the light source emits in a wavelength range of approximately 300 to 800 nm at **(Col 3 Lines 1-2)**.

**5.** Regarding claim 10,Yu discloses an optical system of claim 1, wherein the image sensor comprises a charge-coupled device (CCD) at **(Element 48 and Col 4 Lines 24-26)**.

**6.** Regarding claim 11,Yu discloses the optical system of claim 1, further comprising a controller that is electronically connected to the image sensor, the controller actuating readout of the electronic representation from the image sensor at **(Fig 1 and Col 4 Lines 27-34)**.

**7.** Regarding claim 12,Yu discloses the system of claim 11, further comprising a-processor electrically coupled to the controller, an image storage device and a display device at **(Fig 1, Element 26, Col 3 Lines 39-45 and Col 4 Lines 27-30)**.

**8.** Claim 15 is a corresponding method performed by the system of claim 1. See the explanation of Claim 1.

**9.** Regarding Claim 20, see the explanation of Claim 6.

**10.** Regarding Claim 22,see the explanation of Claim 8.

**11.** Regarding Claim 23,see the explanation of Claim 9.

**12.** Regarding Claim 24,see the explanation of Claim 10.

**13.** Regarding Claim 25,see the explanation of Claims 11 and 12.

## *Claim Rejections - 35 USC § 103*

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

Claims 7,13,14 and 21 are rejected under 35 U.S.C. 103(a) as being unpatentable over Yu.

**14.** Regarding Claims 7 and 21,Yu discloses Light source as Laser at **(Fig 1, Element 14 and Col 3 Lines 1-2)**.

Yu does not disclose expressly the laser as diode pumped Laser but discloses a **Helium or argon Laser with a wavelength of 632.8nm**. The applicant discloses in the specifications on Page 8 under figure 2, as "**The light source can be any laser emitting a wavelength in the range of approximately 300-800 nm**". Applicant has not disclosed that using diode pumped laser provides an advantage, except it provides a light output within a certain range. One of ordinary skill in the art, furthermore, would have expected applicant's invention to perform equally well with Helium or argon laser because the light source is capable to output at 632.8 nm wavelength which falls in the range of the claimed invention. Therefore, it would have been obvious to combine to one of ordinary skill in this art to modify the claimed invention with a Light source **(Helium or argon Laser)** to obtain the invention as specified in claims 7 and 21.

**15.** Regarding Claim 13,Yu discloses a **Laser emitting a light of intensity in the range of 2-15 mW**.

Yu does not disclose expressly a Laser emitting a light of intensity of 1.5 mW. Applicant has not disclosed that a light intensity of 1.5 mW provides an advantage, except as disclosed in the specifications on page 13, as "**The device requires weak light intensity to function**". One of ordinary skill in the art, furthermore, would have expected applicant's invention to perform equally well with a Light source disclosed by Yu with an intensity range from 2-15mW because the particular intensity output is also considered as weak intensity output. Therefore, it would have been obvious to combine to one of ordinary skill in this art to modify the Claimed light source as disclosed by the applicant with a light source as disclosed by Yu to obtain the invention as specified in claim 13.

**16.** Regarding Claim 14,Yu discloses an input image of an object of a certain size.

Yu does not disclose expressly the image size being less than10cm X 10cm. Applicant has not disclosed that the size less 10cm X 10cm provides an advantage, is used for a particular purpose or solves a stated problem. One of ordinary skill in the art, furthermore, would have expected Applicant's invention to perform equally well with size of images that Yu's optical system can handle because Yu's system can handle many different sizes and would equally perform well with the claimed invention. Therefore, it would have been obvious to combine to one of ordinary skill in this art to modify the Claimed invention with the system capable of handling different sizes as disclosed by Yu to obtain the invention as specified in claim 14.

Claims 3 and 17 are rejected under 35 U.S.C. 103(a) as being unpatentable over Yu, Shapiro et al. (US 6246782) hereafter Shapiro and in further view of Carrott (US 6909792) hereafter Carrott.

**17.** Regarding Claims 3 and 17 Yu discloses an input image being generated by a camera at **(Fig 1 element 24)**.

Yu however does not disclose the input image being generated by the medical imaging method and the image is a mammogram. Carrott discloses a two dimensional image being generated by a medical imaging method at **(Col 6 Lines 50-55,Col 2 Line 67 and Col 4 Lines 36-41)**. Shapiro discloses the system for automated detection of cancerous masses in Mammograms in **(Fig 2)** that uses a digital mammogram in **(Col 3 Lines 65-67 and Col 4 Lines 1-4)**. Yu, Shapiro and Carrott are from the same field of endeavor and a hybrid Optical /digital Computer approach as taught by Shapiro and Yu ensures sufficient processing power at a moderate cost to accommodate discriminating algorithms and yet analyze a **mammogram** in a matter of seconds **(Col 3 Lines 12-15)**. Therefore, it would have been obvious for one of ordinary skill in the art at the time the invention was made to have used the hybrid approach for the above-mentioned reasons.

Claims 4 and 18 are rejected under 35 U.S.C. 103(a) as being unpatentable over Yu, Shapiro, Carrott and in further view of well-known prior art **(Official notice)**.

**18.** Regarding Claims 4 and 18, Yu discloses an input image being generated by a camera at **(Fig 1 element 24)**.

Yu however does not disclose the input image being generated by the medical imaging method. Shapiro discloses the system for automated detection of cancerous masses in Mammograms in **(Fig 2)** that uses a digital mammogram in **(Col 3 Lines 65-67 and Col 4 Lines 1-4)**. Both Yu and Shapiro are from the same field of endeavor and a hybrid Optical /digital Computer approach ensures sufficient processing power at a moderate cost to accommodate discriminating algorithms and yet analyze a **mammogram** in a matter of seconds **(Col 3 Lines 12-15)**. Therefore, it would have been obvious for one of ordinary skill in the art at the time the invention was made to have used the hybrid approach for the above-mentioned reasons.

Pap smear is a well-known sample image of the cervix and it aids in detecting an early cervical cancer. A digital representation of the Pap smear image can be replaced with a mammogram image to detect cervical cancer. Thus a cancer detection system can be built for detecting multiple different kinds of cancers.

Claims 2,5,16 and 19 are rejected under 35 U.S.C. 103(a) as being unpatentable over Yu and Carrott.

**19.** Regarding Claims 2 and 5 Yu discloses a system in which an input image being generated by a camera at **(Fig 1 element 24)**.

Yu however does not disclose an input image being generated by at least one of the medical imaging methods such as X-Ray, magnetic resonance, computerized axial tomography and ultrasound imaging.

Carrott discloses a two dimensional input image being generated by ultrasound medical imaging method at **(Col 6 Lines 50-55,Col 2 Line 67 and Col 4 Lines 36-41)**. Carrott also discloses using various imaging modalities for medical imaging at **(Col 1 Lines 25-30)**. Both Yu and Carrott are from the same field of endeavor, therefore it would have been obvious to one of ordinary skill in the art at the time the invention was made to use the historical approach as disclosed by Corrett **(Col 1 Lines 57-61)** in the system as taught by Yu to achieve an accurate diagnosis of cancer in the optical correlation process.

**20.** Regarding claims 16 and 19, Yu discloses a method of Claim 15 in which an input image being generated by a camera at **(Fig 1 element 24)**.

Yu however does not disclose an input image being generated by at least one of the medical imaging methods such as X-Ray, magnetic resonance, computerized axial tomography and ultrasound imaging.

Carrott discloses a two dimensional input image being generated by ultrasound medical imaging method at **(Col 6 Lines 50-55,Col 2 Line 67 and Col 4 Lines 36-41)**. Carrott also discloses using various imaging modalities for medical imaging at **(Col 1 Lines 25-30)**. Both Yu and Carrott are from the same field of endeavor, therefore it would have been obvious to one of ordinary skill in the art at the time the invention was made to use the historical approach as disclosed by Corrett **(Col 1 Lines 57-61)** in the system as taught by Yu to achieve an accurate diagnosis of cancer in the optical correlation process.

## ***Conclusion***

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Jayesh A. Patel whose telephone number is 571-270-1227. The examiner can normally be reached on M-F 7.00am to 4.30 pm (5-4-9). If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Jingge Wu can be reached on 571-272-7429. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

Jayesh Patel JP
2/1/07

JINGGE WU
SUPERVISORY PATENT EXAMINER